

LETTERS TO THE EDITOR.

[The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts intended for this or any other part of NATURE. No notice is taken of anonymous communications.]

Radium and Cancer.

It has occurred to me that perhaps you would care to publish the enclosed letters, and thus start some one experimenting with the radium rays in the manner suggested.

Dr. Sowers is a distinguished physician of Washington, D.C., now spending a portion of his summer vacation in Baddeck, Nova Scotia.

ALEXANDER GRAHAM BELL.

Baddeck, N.S., July 21.

Dr. Z. T. Sowers,
1707 Massachusetts Avenue,
Washington, D.C.

Dear Dr. Sowers,

I understand from you that the Röntgen X-rays, and the rays emitted by radium, have been found to have a marked curative effect upon external cancers, but that the effects upon deep seated cancers have not thus far proved satisfactory.

It has occurred to me that one reason for the unsatisfactory nature of these latter experiments arises from the fact that the rays have been applied externally, thus having to pass through healthy tissues of various depths in order to reach the cancerous matter.

The Crookes's tube from which the Röntgen rays are emitted is, of course, too bulky to be admitted into the middle of a mass of cancer, but there is no reason why a tiny fragment of radium sealed up in a fine glass tube should not be inserted into the very heart of the cancer, thus acting directly upon the diseased material. Would it not be worth while making experiments along this line?

Yours sincerely,

(Signed) ALEXANDER GRAHAM BELL.

Baddeck, N.S., July 21.

Dr. A. Graham Bell,
Baddeck, N.S.

Dear Dr. Bell,

The suggestion which you make in regard to the application of the radium rays to the substance of deep seated cancer I regard as very valuable. If such experiments should be made, I have no doubt they would prove successful in many cases where we now have failures.

Yours sincerely,

(Signed) Z. T. SOWERS, M.D.

Baddeck, N.S., July 21.

The American Tariff and the St. Louis Exhibition.

As a member of the Royal Commission appointed to make a success of the British Section of the St. Louis Exhibition, I have, in common with some of my colleagues, been met by the difficulty, which for a time seemed an insuperable one, that our manufacturers could not be prevailed upon to send their goods to this exhibition, even though they would be admitted duty free, because the tariff had practically killed their trade with the country.

Even in the subject in which I am interested, instruments of precision, I have been met with this answer to such an extent that for a time I feared that the formation of a representative collective exhibit would be impossible.

I wish, if you will afford me the space, to point out to our manufacturers that in our class the incidence of the duty need not be so disastrous to trade as it must be in

many others. Not only will instruments and other goods sold from the exhibition to public institutions in the United States be allowed to be sold free of duty, but instruments and other goods sold to public institutions in the United States from this country are also admitted free of duty. (See extract from Tariff Law below.)

As in the case of instruments of the highest class the requirements of public institutions are necessarily large in comparison with the demands of the public, more especially, I believe, in a country like the United States, where institutions of this kind are so liberally supported, and as this disparity is probably greater in the case of goods in this class than in any other, I hope you will enable me through your columns to urge our makers to reconsider any refusal to assist the Royal Commission in the formation of an adequate collective exhibit that may have been made on these grounds, and to avail themselves of such advantages as we are able to offer.

Section 638 of the Tariff Law of 1897 provides as follows:—

“638. Philosophical and scientific apparatus, utensils, instruments and preparations, including bottles and boxes containing the same, specially imported in good faith for the use and by order of any society or institution incorporated or established, solely for religious, philosophical, educational, scientific or literary purposes, or for the encouragement of the fine arts, or for the use or by order of any college, academy, school, or seminary of learning in the United States, or any State or public library, and not for sale, subject to such regulations as the Secretary of the Treasury shall prescribe.”

It should be noted, however, that surgical instruments are not classified as philosophical or scientific.

C. V. BOYS.

The Eucalypts.

YOUR reviewer of two recent works on Eucalypts (April 2, p. 524) seems to require correction on certain points. *Eucalyptus globulus* cannot be considered as the first in economic importance amongst the Eucalypts. In almost every shade of extra-tropical climate there is to be found a Eucalypt which will grow as well, or better, than *E. globulus*, and yield a far superior timber. It is generally held now that Eucalypt planting has suffered by the indiscriminate praise showered on *E. globulus* by the early Eucalypt enthusiasts.

Your reviewer says, further, that Eucalypt plantations now exist in Italy, France, Algeria, California, and other countries. He does not appear to be aware that there is probably more Eucalypt plantation in South Africa than in any other country, and that at the present rate of progress there will, in a few years, be more Eucalypt plantations in South Africa than in all the other countries combined. There is no group of trees in the warm temperate regions of the world that can produce hardwoods of good quality so rapidly and so cheaply as Eucalypts, and their cultivation bids fair to become the central factor in the forestry of these regions. At this moment train-loads of Eucalypt timber are pouring into South Africa, Eucalypt sleepers displacing metal and creosoted-pine sleepers. South Africa will soon be paying out something like a quarter of a million pounds yearly for Eucalypt timber imported for railway sleepers and mining timber (little or none of this, by the way, *E. globulus*), so that any delay in the prosecution of Eucalypt planting in South Africa would be a most expensive proceeding. It is noteworthy that, so long as the Eucalypt is properly fitted to its climate, it seems to grow better in South Africa than in Australia, the explanation being probably that all the Eucalypts in South Africa have been raised from seed, and are thus growing in South Africa free from their Australian pests, both fungoid and insect. With the view of preserving this happy immunity from disease, the importation of Eucalypt plants into Cape Colony is placed under stringent restrictions.

The meritorious work of Messrs. R. T. Baker and H. G. Smith, if carried to a conclusion, should be the classic for many years on Eucalyptus oil. Your reviewer is mistaken in saying that practically all the Eucalypt species indigenous to Australia are included in their work. Practically, all the Eucalypts are indigenous to Australia, but they are not included in Messrs. Baker and Smith's work, which em-

braces 111 out of 120 described species of New South Wales and a few others from the neighbouring colonies of East Australia, but none of the well-known timber Eucalypts of Western Australia, Jarrah, Kari, Touart, red gum, York gum, &c.

It is a little disappointing that the authors were unable to obtain leaves of such a prominent Eucalypt as *Eucalyptus regnans*, the tree which shares with *E. diversicolor* the honour of being the tallest tree in the world. It is common enough in the Government plantations near Cape Town, as is also *E. alpina*, which figures also in the list of unprocurables. It is particularly unfortunate that they have not tested *Eucalyptus calophylla*, the type of the parallel veined Eucalypts. This is a West Australian species.

Messrs. Baker and Smith state that forty tons of Eucalypt leaves were used and 500 distillations made. Their work is a model of painstaking investigation, and to the chemist and those interested in the oil industry will no doubt prove extremely useful.

But the authors have not confined themselves to the chemistry of Eucalyptus oil. They propose a number of new Eucalypt species and a new classification of Eucalypts. How far the numerous new species will stand the test of critical investigation in the field remains to be seen. Many of their new species have already been contested.

Messrs. Baker and Smith have discovered that there is a relation between the venation of Eucalypt leaves and the chemical constitution of the oils of those leaves. Parallel veins and pinene go together. Many of the parallel veined leaves smell of turpentine like a pine leaf. Then come the peppermint Eucalypts, containing piperitone, with a more complex venation; and then a still more complex venation yielding oils rich in eucalyptol or cineol, which is the valuable constituent in the best Eucalypt oils. This is a very interesting and important correlation, especially if further investigation shows that it holds good through the whole Eucalypt genus. As chemists, one can pardon the authors their enthusiasm over it. But whether it is sufficient to found a new classification of Eucalypts on may be doubted. We have numerous Eucalypt classifications in the field. There is that which is generally accepted in default of a better, the anthereal system of Bentham, somewhat modified and simplified, but not improved in Mueller's subsequent works. There is a (perhaps more practical) bark system, and there are various obsolete systems founded on the shape of the cones and the flower buds. As Messrs. Baker and Smith most justly remark, a natural classification founded on a combination of all these, including the quality and structure of the timber, has yet to be made. It is not likely that their oil-and-vein classification will be sufficient in itself. It seems unlikely that anyone, except a scientifically trained forester, who has spent a large portion of his life among the Eucalypts in their natural forests, will be able to construct a sound natural grouping of the species of this difficult genus. The work will require a Mathieu, a Brandis, or a Gamble, that is to say, a practical forester with special scientific qualifications. It is not to be done with botanical specimens as Bentham and Mueller attempted it, nor with practical knowledge alone as Wools attempted it, nor in a chemical laboratory where Messrs. Baker and Smith have done most of their work! It is true that Mr. Maiden is now bringing out a "Critical Revision of the Genus Eucalyptus," and from this, with his great reputation as a practical botanist, much is expected. The first number, on that very important species *Eucalyptus pilularis* and its allies, has already appeared, also part ii. on *E. obliqua* and the gum-top stringy barks.

In view of the differences in the quality of the oil yielded by various Eucalypts, the authors advocate plantations in certain circumstances of good oil-yielding species. The lopping they suggest a forester would replace by coppicing. It is believed that all Eucalypts coppice well. Most of them will stand a considerable amount of lopping, but it eventually kills them. It is only in a few instances that species of Eucalyptus are found predominating over an area of country to any great extent, so that a particular species being worked for its oil may soon be cut out in close proximity to a permanent plant. But some Eucalypts are very tenacious of life, and "suckers" soon spring from the stumps of the trees cut down; it is thus only a matter of a few years when fresh material is again obtainable. This may be seen from the photograph of *E. Smithii*, where

most of the dense growth is from "suckers" of this nature. We have been able to show, in several instances, that the oil obtainable from this young growth is of the same character as that obtained from the mature leaves, so that no great differences in the quality of the oil need be expected. But we think it to be a pity that the trees should, in many instances, be felled for their leaves alone. By judicious lopping a fresh supply of leaves could more quickly be obtained, so that a permanent supply might be assured. There are a few species of Eucalyptus, however, which form the prevailing vegetation in certain localities, and are found growing gregariously in their native habitat; this is particularly the case with some of the "Mallees." In New South Wales there are several species of this nature, as, for instance, the "Blue Mallee," *E. polybractea*; the "Red" or "Water Mallee," *E. oleosa*; the "Grey Mallee," *E. Morrisii*; and the "Argyle apple," *E. cinerea*; all these species give good eucalyptol oils, and all are more or less gregarious in their habits, so that natural plantations of these species are practically ready to hand; but besides these naturally covered areas the question of the cultivation of certain Eucalyptus species is of importance in this connection.

It may possibly be accepted as conclusive that some Eucalyptus species are not inexhaustible under certain conditions, and it is worthy of consideration whether plantations of young trees of *Eucalyptus Macarthuri*, for instance, might not be profitably cultivated for the preparation of its valuable geranyl-acetate oil. So with the eucalyptol oils, it is probable that the cultivation of some species, *E. Smithii*, for instance, could be profitably undertaken, and from which young growth an oil could be distilled that would compete satisfactorily, both in price and eucalyptol content, with any European oil of this class.

A minor fault running all through their book is their use of the word "sucker." By "sucker" is properly understood shoots from the roots, such as one sees in poplars, elms and willows. Eucalypts do not sucker (except rarely and accidentally), and the authors use the word in the sense of "coppice shoot." No doubt "sucker" is an Australian colloquialism, but naturally the use of slang expressions is to be avoided in a scientific work. To be accurate the authors should use the term early or first foliage, or its equivalent, since this important diagnostic feature is seen in the first foliage of Eucalypt seedlings equally with coppice-shoots.

As yet no one of the Australian colonies has taken the first step in scientific forestry. Though Mr. Maiden in his various writings has let in a flood of light on the subject, and the student of Eucalypts stands deeply in his debt, there is not a line by a scientifically trained forester descriptive of the forests of Australia. There is no want of liberality on the part of Australia in endowing the researches of scientific men living in cities, but there is a woeful neglect of forestry in the field. Scientific forestry as understood on the Continent of Europe is unknown in Australia, and unless the Commonwealth can bring its attention to bear on the terrible waste of its natural forest resources now going forward, its future history will be a black one, comparable only in modern times to that of the Spaniards in Mexico.

In the older settlements of East Australia the forests, pillaged of their best species, or burnt and ruined, have greatly declined in value. Gone are the valuable reserves of iron-bark, tallow-wood, and forest mahogany among the Eucalypts, and the splendid cedars (*Cedrela toona*) which should have been the country's pride. South Africa is getting most of its timber from the comparatively newly settled West Australia. The Australian has yet to learn to take the honey without destroying the bees!

When your reviewer takes us to America, we get amongst a people awakening to the fact that there is such a thing as scientific forestry. As he remarks, the American volume on Eucalypts is excellently got up. It is a pleasure to turn over the pages with their life-like pictures of Eucalypts. It is not likely, however, that there will ever be any great production of Eucalypt timber in North America. It is only South California that quite repeats any Australian climate, namely, South-West Australia. It is doubtful if Eucalypts will ever do much in the eastern States. The Gulf States, which are alone suited to Eucalypts, have their cold snaps and freezes, together with an all-the-year-round rainfall which we do not find in Australia, while there is

an abundance of good hardwood already in the country, and the four pitch-pines, rivalling hardwoods in strength and durability. Eucalypt culture in America is still in its infancy; they have not yet discriminated the valuable from the many worthless species, nor fitted, as far as may be, the species to its climate.

D. E. HUTCHINS.

E. HUTCHINS.

Cape Town, June 23.

A Simple Form of Tide Predictor.

For the past four years a very simple form of tide-predicting machine, the invention of Captain A. Inglis, the harbour-master, has been in use at Port Adelaide for the construction of the yearly published tide tables. The tides at Port Adelaide are rather peculiar in their behaviour, this being due principally to the fact that the solar and lunar semi-diurnal components are almost exactly equal. At and near the neaps these neutralise one another, and the diurnal components, which are relatively large, are then the main sources of the tidal movement. Before these tides were harmonically analysed, their prediction by ordinary methods was quite impossible, except near the springs. By means of this machine, however, they are now predicted yearly with considerable accuracy. The essential principles of the machine are as follows:—A number of thin wooden templets are cut, each in the form of a sine curve, representing the various tidal components (Fig. 1). These waves are of different lengths, the length of each component wave bearing

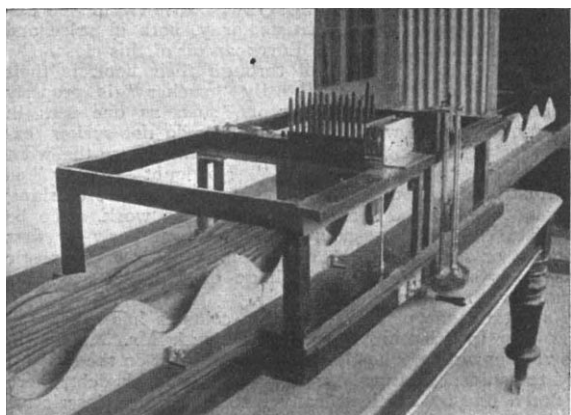


FIG. 1.

the same ratio to the solar semi-diurnal as its angular speed does to 15° . The templets are all fixed side by side, with their planes vertical and parallel, being supported on a carrier, which can be moved forward in the direction of the waves by means of a rack and pinion underneath. A number of vertical plungers rest in a transverse line with their lower ends resting on the tops of these templets, and are moved up and down as the curves progress forward. The motions of the plungers are then compounded by means of a fine wire passing over pulleys at the top of each one, and under fixed pulleys between adjacent ones. This wire is connected to an indicator, which moves up and down alongside a vertical scale, thus marking the height of the compound wave at any instant.

The wire passing over the plungers is an endless wire, going round a pulley on the indicator and round a larger pulley at the other end of the line of plungers. This larger pulley is attached to a plate which is movable backwards and forwards by means of a fine screw. This gives a means of adjusting the height of the indicator, and also of allowing for the effect of the annual and semi-annual tides. The rise or fall due to these long period tides is treated as constant for fourteen days, and the screw adjusted so as to alter the height of the indicator by the proper amount at the end of each such interval. In front of the frame of the machine, between it and the indicator, is a vertical slide, which is moved forward at the same rate as the carrier, and

carries a sheet of paper on which the tidal curve may be traced if required (Fig. 2).

Each templet is fixed in the carrier in proper relative position according to its phase at the start, as determined by previous harmonic analysis. When the handle of the machine is turned, the carrier, vertical slide and clock are set in motion, and the indicator shows the height of the

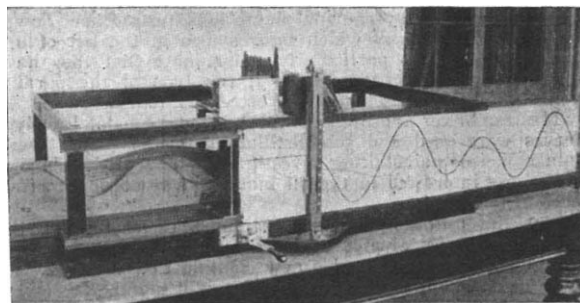


FIG. 2.

tide at the time shown by the clock, and the curve may at the same time be traced on the vertical slide.

There are three carriers and three or four templets to each component. When one of the carriers has been worked forward far enough, it can be disconnected from the others and connected up again at the other end. The curves are again placed in their respective grooves, and, by means of a suitable attachment, butted close up to the preceding ones. In this way the process is made continuous.

The setting of the curves can easily be checked at every month, to see that there has been no slipping.

The machine involves no expensive construction, and enables a year's tides to be predicted expeditiously, and, as experience has proved, with quite sufficient accuracy.

The University, Adelaide.

R. W. CHAPMAN.

[In a subsequent letter, Mr. Chapman informs us that he made the following errors in the list of values of the tidal components at Port Darwin, printed in last week's NATURE (p. 295). "The amplitude of N should be 1.04, of ν 0.48, and of T 1.53. The phase of ν should be 141° , and that of T 70° ."—Ed. NATURE.]

Sympathetic Song in Birds.

IN your issue of April 30 (vol. lxxvii. p. 609) Mr. George Henschel describes an interesting vocal duet between a bullfinch and a canary, and invites contributions to the subject.

In 1893 I obtained a nestling Australian magpie (*Gymnorhina tibicen*, Latham), and taught it on the flute to pipe the following:—



Some years later I acquired another bird of the same species; this learned the tune from the original magpie. I do not know how the birds agreed upon the duet (or fugue) rendering, but it was performed in the following way:—When the first bird commenced its song, the second one immediately came to attention, and with half-open beak awaited the point marked *, whence it finished the strain alone. The birds were kept in a large outdoor aviary in company with many others, and no matter where or how engaged, the second bird would, on hearing its mate, assume an attentive attitude, and await the conclusion of the first portion of the theme.

The second bird died, and the original one, which I still have, now pipes the whole strain alone, as was its original custom.

I may also mention that this bird has the faculty of absolute pitch, and pipes the theme in F as originally taught.

EDGAR R. WAITE.

Australian Museum, Sydney, June 18.